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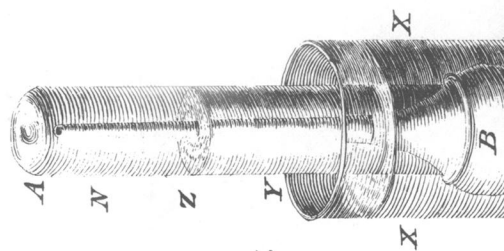
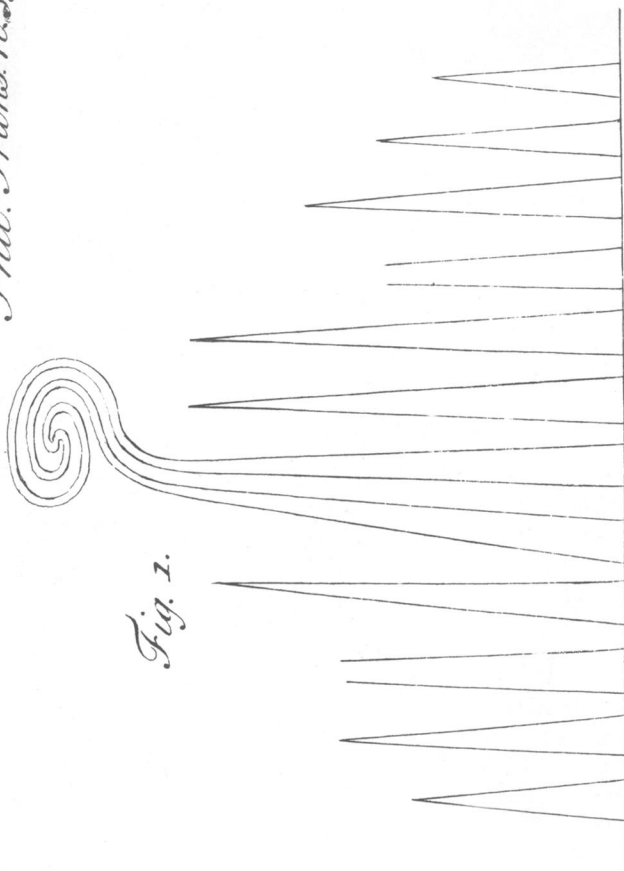
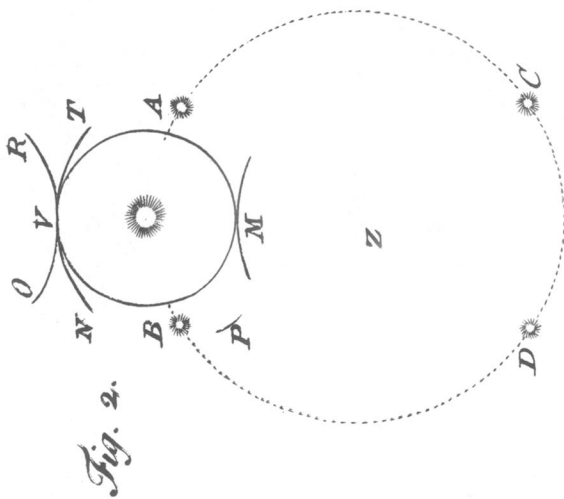




Fig. 3.

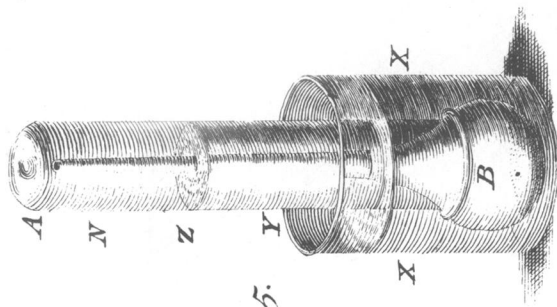


Fig. 5.

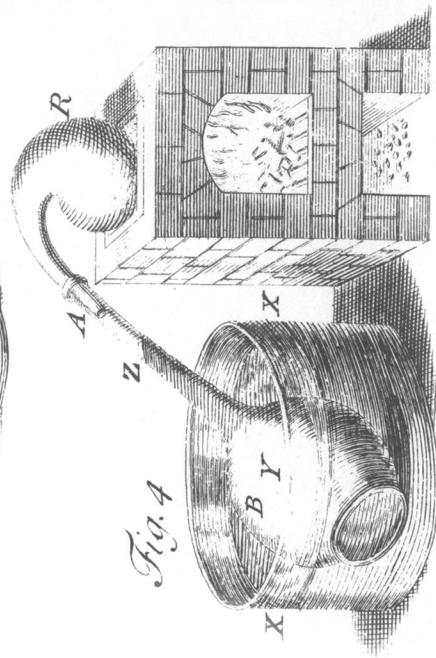


Fig. 4.

I. *Observations on the Lumen Boreale, or Streaming on Oct. 8, 1715, by the Reverend Mr. W. Derham, F. R. S.*

ALthough the *Lumen Boreale*, or *Streaming* hath been a common Phænomenon, ever since the surprising one, *Mar. 6, 1715, 16*, and as such, would not deserve to be taken notice of; yet in this of *Oct. 8*, there were not only such surprising, but different Circumstances, that, I hope, the Royal Society will receive Accounts of them from many Hands; which may enable the skilful Meteorologists to find out their Cause.

For the clearer proceeding in my Relation, I shall observe, that there are two sorts of *Streamings*, which I have taken notice of; one, by way of *Explosion* from the Horizon; the other, by *opening* and *shutting*, without such Shootings up, and swift Dartings, as those were which appeared in the *Lumen Boreale* before spoken of.

Of the latter sort chiefly, was this last of *Oct. 8*: in which, altho' the *Streams*, or *Spires*, or *Lances*, or *Cones* or, what shall I call them?) were as large and remarkable as in the former; yet they exhibited themselves principally by the vaporous Matter opening and shutting, as if a Curtain had been drawn and withdrawn before them.

The first View I had of this Phænomenon, was precisely at Eight o'Clock in the Evening: At which time, all I saw, was a long narrow *Fascia*, like a white ragged Cloud, extended cross the Heavens, from

W. b. S. to E. b. N. which in a few Minutes began to emit some Streams, and then disappear'd : Which was succeeded by much Streaming in the Northerly Parts ; and in a quarter of an Hour it began to reach other Points also ; and soon after that, it streamed all round in the Southerly, Easterly and Westerly Parts as much, or nearly as much as in the North. Which was a thing I never had seen before in these Phenomena.

Fig. 1. These *Streams*, or *Cones*, were for the most part pointed, so as to make the Appearance of *flaming Spires*, or *Pyramids*; and some others were truncated, and reach'd but half way : Some also were longer, and some shorter; some of which had their Points reaching up to the Zenith, or near it, where they formed a sort of *Canopy*, or thin Cloud, sometimes red, sometimes brownish, sometimes blazing as if fired, and sometimes emitting Streams all round it, which at that time gave it the appearance of such a Star as our Knights of the Garter wear on their Breasts.

This *Canopy* was manifestly formed by the Matter carried up by the Streaming on all parts of the Horizon : Which Matter sometimes seem'd to ascend with some force, as if impell'd by the Impetus of some explosive Agent below, as I have said it was in the Streaming of *March 1715, 16*, and which I gave the Society a large and particular Account of soon after. This forcible Ascent of the streaming Matter, gave a Motion to the Canopy, sometimes a Gyration, like that of a Whirlwind ; which was manifestly caused by the Streams striking the outside Parts of the Canopy, as in the Figure : But when the streaming Matter hit the Canopy in the Middle, all was then in Confusion.

These two Particulars, namely, the *Streaming all round*, in all Points of the Horizon; and the *Canopy* in and near the Zenith, are what were taken notice of in all Parts of *England*, that I have met with any Accounts from; particularly, in *Northamptonshire*, *Staffordshire*, *Oxfordshire*, *Wiltshire*, *Berkshire*, *Middlesex*, *Somersetshire*, and *Essex*, and in divers Parts beyond Sea.

The Reverend and Learned Mr. *Wasse* gives me this Account of its Appearance at *Aynho* in *Northamptonshire*, That at 7 h. 20/ p. M. he saw an Arch somewhat curved, like a Rainbow at first, and about half the Breadth of the Rainbow, and yellow; which in about ten Minutes began to twist, and make an Angle at the Zenith: That one End of it was pretty much to the East, and not directly to the North; and the Western End deflected as much to the South: That it remained after the Twist, at the Zenith, without any great Motion, not a quarter of an Hour. After which, the Rods arose on all sides, from the Horizon to the Zenith, the upper Points seeming to move thro' a sort of Vortex quite out of our Atmosphere: Which Rods, he thinks, rose perpendicularly from the Horizon, but seemed to converge towards the Zenith, according to the Rules of Perspective, by their Angle then being less than their Basis at the Horizon: That a Redness was perceived, which, he thinks, was strongest towards the West; which Colour did not appear till the Arch brake into several Pieces, and overspread the Heavens with a thin faintish Fire, thro' which they saw *Jupiter* very clearly.

This Account of Mr. *Wasse's* may shew, how the Phænomenon was in *England*; by reason most of the

Accounts I have met with, concur in the main with his But in the more Southerly Parts of *Europe*, I take it to have been somewhat different. The News-Papers tell us from *Scaffhausen*, that on the 19th of "*October* there was a great Alarm in many Parts of "*Switzerland*, on account of a great *Light* seen in "*the Air*, from 7 o'Clock till Midnight; which was "*supposed to be the Reflection of some great Con-* "*flagration. At Bern*, every body thought there "*was a Fire in some part or other of the City or* "*Neighbourhood. At Neufchatel*, the Alarm-Bells "*were rung, and the Governour several Hours on* "*Horseback, to give Orders, &c. as in Cases of* "*Distress. All which they heard afterwards, was* "*only an Aurora Borealis."* And from *Florence*, my ingenious and curious Friend Sir *Tho. Dereham* sent me this Account, "*As to the Lumen Boreale*, which appear'd in "*these Parts on Oct. 8th last, I saw it my self in the* "*following manner: It was one Hour and half after* "*Sun-set, when I was passing thro' a Piazza in this* "*Town, that I discover'd the Phænomenon, that* "*seem'd one Mile long, and three quarters of a Mile* "*broad, of an almost perfect Oval Figure, hanging* "*North and North-East to us: The Edges of it were* "*of pale light Colour, like the first Dawn of the* "*Morning; and towards the Center, it encreas'd its* "*fiery Colour; so that in some Places it look'd as the* "*Fire of a Furnace; but in the very Center, and many* "*adjacent Parts, it was like a red-hot Iron growing* "*cold, that seems bloody. For a good while I could* "*perceive no Motion in it; but after a quarter of an* "*Hour, I discover'd a general slow Motion backwards* "*and forwards, like that one sees of the Circulation* "*of the Blood in the Tails of Fishes, by the help of* "*the Microscope, but no manner of Darting; info-* "*much*

“ much that in another quarter of an Hour it vanish-
 “ ed imperceptibly, just as a Rainbow, and the Air
 “ grew dark again, that was so luminous before, that
 “ one might read a Manuscript by the same. It is
 “ very remarkable, that at *Fiesole*, a Town with-
 “ in a short Mile of this, the Phænomenon seem’d to
 “ those Inhabitants, to be between them and us, and
 “ they thought our Town was burning: Whereby it
 “ appears not to have been very deep, nor very high;
 “ *Fiesole* standing upon a Hill half a Mile high, and
 “ to the North-North-East of this Town.

To these Observations of my self, and some of my
 Correspondents, I shall add two or three things more,
 before I enquire into the Cause of the Phænomena.

One thing that was taken notice of in most Places,
 was, That in some part of the greatest Streaming, the
 Vapours between the Spires, or Lances, were of a
 Blood-red Colour. That which I observ’d, was,
 That about half an Hour after Eight o’Clock, the Va-
 pours towards the South-West were very dense, and
 for some time red. And not long after, the like Red-
 ness arose in the North-East, and the other gradually
 went off. Both which gave those Parts of the At-
 mosphere the Appearance of blazing Lances, and
 bloody-colour’d Pillars.

Another thing I took notice of, was, a strange Com-
 motion, and Working among the Streams, as if some
 large Cloud, or other Body was moving behind them,
 and disturb’d them.

In the Northerly and Southerly Parts the Streams
 were perpendicular to the Horizon; but in the inter-
 mediate Points they seem’d to decline more or less one
 way or other; or rather to incline towards the Meri-
 dian.

As for the *Weather*, the preceding *Day* was cloudy, with an Hoar-Frost in the Morning; but it clear'd up, and grew warmer afterwards; but towards the *Horizon*, very vaporous. And the next Morning (after the Streaming before Sun-rising, the Air was full of Vapours, with divers thin vaporous Clouds, some of a lucid brown, some reddish, which I took to be Remains of the Streaming, which, I was informed, continued all Night.

As for the Cause of these Phænomena, I take it to be from the same Matter, or Vapours, which produce Earthquakes: And that for these Reasons: *First*, Because some of these Phænomena have been followed by Earthquakes. As that which *Stow* gives an Account of in his *Annals*, in the Year 1574, on Nov. 14. in which he saith, *were seen in the Air strange Impressions of Fire and Smoak to proceed forth of a black Cloud in the North towards the South. That the next Night following, the Heavens from all parts did seem to burn marvellous ragingly, and over our Heads the Flames from the Horizon round about rising did meet, and there double and roll one in another, as if it had been in a clear Furnace.*

And after this (he tells us) followed on the 26th of February, great Earthquakes in the Cities of York, Worcester, Gloucester, Bristol, Hereford, and in the Countries about, which caused the People to run out of their Houses, for fear they should have fallen on their Heads. In Tewksbury, Breedon, &c. the Dishes fell from the Cupboards, and the Books in Mens Studies from the Shelves: With more to the same purpose.

So this last (in October) was preceded by that fatal Earthquake at *Palermo* in *Sicily*, and succeeded by one in *England*, on Tuesday, October 25, following. This, I hear, was perceived in *London*, and was very considerable

derable at *Dorchester, Weymouth, Portland, Portsmouth, Purbeck*, and divers other Places in *Dorsetshire*, that it caused the Doors to fly open, shook down Pewter off the Shelves, and was felt in some Ships that lay in the Harbours.

2. Another Reason is, That I am assur'd by an ingenious sensible Gentleman of my Acquaintance, that as he was viewing this Appearance, on the Top of his House at *Little Chelsea*, he plainly perceived a Sulphureous Smell in the Air ; and that another Person did the same, on the Top of another House near him.

3. Another thing which concurs with what hath been said, is, That I am assured from several Persons, that an Hissing, and in some Places a crackling Noise was heard in the time of the Streaming, like to what is reported to be often heard in Earthquakes.

And now, for a Conclusion, I shall remark two things upon what hath been said.

1. That it may help the sagacious Meteorologist to resolve several Difficulties relating to these *Northern Lights*, to observe, that what was *Streaming* or *Darting* in our Northern Parts, was only a remarkable Light, or Blaze in *Italy*, and the Southern Parts, if I take Sir *T. Dereham's* and the News-Papers Accounts right.

2. If those Phænomena have the same Origine that Earthquakes have, that then they are, doubtless, of great use to the Peace and Safety of the Earth, by venting some of that pernicious Vapour and Ferment that

that is the Cause of those terrible Convulsions, which Earthquakes are accompanied with.

I forgot (when I described the *Canopy* or *Corona*) to say, that it did not rest in one place ; but changed its Position sometimes higher near the Zenith, and then towards the East, and South-East, 10 or 15 Degrees, and then back again nearer the Zenith, according as the darting Matter directed it : But I do not remember, that this Canopy was at any time directed towards the Western Points.

In most of the *Northern Lights* that I have seen, there generally was a dark Bank of Vapours, circular on the Top ; but whether this of Oct. 8, had any such Arch, I could not see at *Upminster*, where I was surrounded with Trees.